NOAA REPORT

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A Behind the Scenes Look

Robert Chartuk/NOAA

The NOAA Ship Rude searches for the wreckage of John F. Kennedy, Jr.'s, Piper Saratoga.

NOAA Ships Survey, Locate JFK Jr. Plane

Following Rear Adm. Evelyn Fields' assumption of command ceremony in the Washington, D.C., Navy Yard July 27, Lt. Cdr. James S. Verlaque, NOAA, and Lt. Cdr. Gerd Glang, NOAA, members of the team that located the wreckage of John F. Kennedy, Jr.'s, downed Piper Saratoga, recalled the rush of events that came to dominate their lives and the consciousness of the nation just one week earlier.

—By Dane Konop

When he heard the news that John F. Kennedy, Jr.'s, Piper Saratoga was missing and feared down off Martha's Vineyard on Saturday morning, July 17, Lt. Cdr. James S. Verlaque, commanding officer of the NOAA Ship *Rude*, was in port on Long Island.

Because *Rude's* specialty is precisely locating and charting objects on the sea floor that might be obstructions or hazards to navigation, Verlaque knew his ship could help. He immediately notified the Coast Guard that *Rude* was available for assistance.

Verlaque then began rounding up the members of his crew who had the weekend off.

"They were all out. Some were looking for fuel. Others were golfing. Some were hiking," Verlaque said.

The 60-mile trip to the waters off Martha's Vineyard took about five hours. They arrived at dusk.

The search for the missing Piper was underway, television stations preempted their regular broadcasts for coverage of the apparent crash, and the nation stood transfixed.

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Deployment of AWIPS Tops Off Weather Service Modernization

NOAA and Department of Commerce officials marked a major milestone in the modernization of the National Weather Service July 28—deployment of the Advanced Weather Interactive Processing System at 152 forecast offices and other sites across the country.

AWIPS is a high-tech, interactive weather computer and communications system that gives Weather Service forecasters access to satellite imagery, Doppler radar data,

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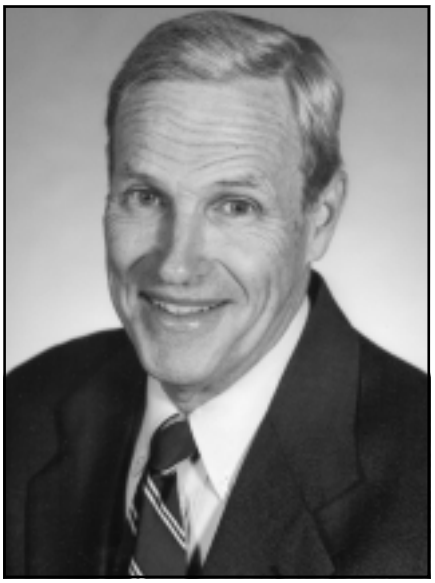

Iris Harris/DOC

Weather Service director John J. Kelly, Jr.: "The completion of AWIPS is a testament to years of hard work by hundreds of government and private sector individuals." See page 4 for more.

Hackers Hit National Severe Storms Lab, Storm Prediction Center Web Sites

—By Kelly Tarp

Hackers vandalized the Web site of NOAA's Storm Prediction Center and National Severe Storms Laboratory recently, causing more annoyance than real harm.

The Storm Prediction Center site is located on a server managed by the National Severe Storms Laboratory, which is co-located with the Storm Prediction Center in Norman, Okla.

Hackers calling themselves the "Keebler Elves" replaced the main page of the Storm Prediction Center's Web site with their own graffiti about 2 a.m. June 29.

When their virtual mischief was discovered around 3 a.m., NOAA computer technicians shut down the page and separated all Storm Prediction Center systems from the server as a precaution to determine the extent of the damage, delaying some email temporarily.

The popular site, which gets from 5,000 to 50,000 hits a day, is an unofficial but convenient source of weather information, especially for emergency management officials planning ahead for severe storms, according to Storm Prediction Center director Joseph Schaefer.

While they created a nuisance, the hackers did not affect the center's critical operations, he said.

The hackers also tried to break into the National Severe Storms Laboratory's Web page, but deleted it instead, probably by accident, according to Kevin Kelleher, the lab's chief information officer.

The laboratory Web site is an important resource for anyone seeking information about severe weather research, receiving at least 150,000 hits a day.

The Web site for another NOAA organization in Norman, the National Weather Service Forecast Office, is also housed on the laboratory's server.

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Ronald Bell/DOC

Deputy Secretary of Commerce Robert Mallett (left) heads the receiving line congratulating Rear Admiral Evelyn J. Fields (right) after she formally assumed command of the Office of NOAA Corps Operations and the NOAA Corps in a ceremony July 27 at the Washington, D.C., Navy Yard.

AWIPS in Place

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automated weather observations and computer-generated numerical forecasts, all in one workstation.

The system was developed by the National Weather Service, the Forecast Systems Laboratory in Boulder, Colo., the Systems Acquisition Office in Silver Spring, Md., and Litton PRC of McLean, Va., the primary contractor. It replaces an older computer system called AFOS, short for Automation of Field Operations and Services, that had been in place in Weather Service forecast offices since the 1980s.

AWIPS is one of the three keystones of the modernization, along with the Automated Surface Observing System and the WSR-88D weather surveillance radar, also now in place nationwide.

"Today we celebrate the beginning of modernized operations of NOAA's National Weather Service," said Deputy Secretary of Commerce Robert Mallett at a July 28 ceremony at the Baltimore-Washington Weather Service Forecast Office in Sterling, Va.

"The installation of Advanced Weather Interactive Processing System units is a milestone in the revolution of weather services for our country," he said. "Timely and accurate weather, water and climate information impacts the economy and the well-being of every citizen and business in this nation. We will continue supporting the research, development and installa-

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The Little Ship That Could

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Exactly three years earlier, *Rude* had located the wreckage of TWA Flight 800 that crashed off Long Island. And now the ship was back in the national spotlight.

At 90 feet in length, *Rude* is one of the smallest vessels in the NOAA Fleet, highly maneuverable and the perfect size for operating in busy, near-shore waters.

Although it's one of the older vessels, *Rude* is equipped with both a modern multibeam sonar attached to one side of the ship, called SEABAT, and a side scan sonar, a three-foot-long "fish" that is towed behind the ship. In the hands of its highly skilled and experienced crew, the ship is a most powerful survey tool.

"We did a surface search first," Verlaque said, "and about 45 minutes thereafter we started 24-hour sonar operations."

Rude remained on station all night.

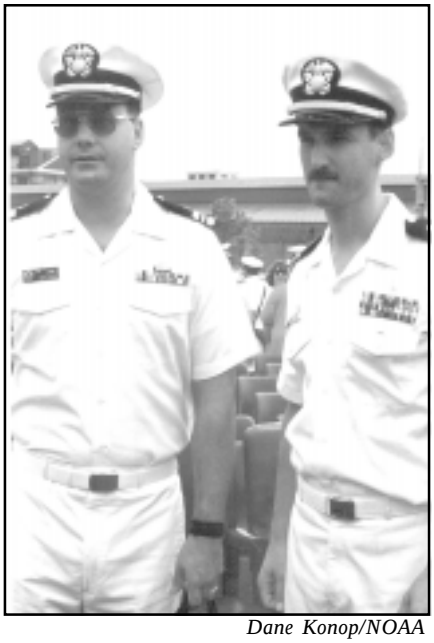
Ashore, authorities and the nation began to fear the worst, that there might be no survivors to find, only wreckage.

On Sunday afternoon, Robert Hancock, an inspector with the National Transportation Safety Board, came aboard *Rude*.

"Hancock provided insights into flight aerodynamics, the size of the Piper, what he suspected the Piper looked like and, based on the one radar position (they had at the time), how he suspected it was heading and its location," Verlaque said.

But where to start surveying?

Verlaque and his executive officer, Lt. Eric Berkowitz, had already looked over the charts and determined a grid for "mowing the lawn," running the ship on a precise, straight line course while surveying with sonar, then returning on a parallel course, close enough to the previous line so that the paths surveyed overlap and there is total coverage of the bottom.



Dane Konop/NOAA

James S. Verlaque (left) and Gerd Glang, C.O.s of Rude and Whiting, respectively.

"We were going with a guess," Verlaque said. It was a great guess, but just off the mark. Ironically, Verlaque said, "had we started 250 meters further north, we would have located the wreck within an hour or two."

For most of the day, they ran lines of hydrography off Martha's Vineyard in a four- by six-mile grid, dodging lobster pot buoys as they steamed along at four to five knots: six miles east, then turn around and come back six miles west. On each pass, the ship scanned an area about 200 meters wide, roughly the area of two football fields.

It was not unusual for the crew to run 24-hour survey operations. "Everybody knew their post. Everybody knew what their operation was," Verlaque said. And everybody gave a special effort.

"We were trying to find closure for the families. They were obviously grieving, and wanted a resolution. So everybody was geared up—myself and the crew—in a 'find it, find it' mode," Verlaque said. "There was not much time to think about anything except locating the site."

At this point, Verlaque and his XO were actually working 20 hours on, four hours off, and staying in touch with the rest of the search team by cell phone. The work continued all night.

Monday morning, the searchers switched to secure VHF hand-held radios because their cell phone calls were being intercepted. At midday, *Rude* dropped marker buoys on four sonar targets that looked promising. Shortly thereafter, *Rude* received new information from the NTSB—the locations of the Piper's last four radar positions.

Rude returned to the area where it earlier had spotted suspicious targets, shifted from a rectangular grid to a two-mile-square grid and redoubled its earlier efforts.

In the meantime at 11 a.m., the NOAA Ship *Whiting* arrived on the scene, having steamed all night from Delaware Bay. *Whiting*'s commanding officer, Lt. Cdr. Gerd Glang, said he "drew a straight line from Delaware Bay up to Martha's Vineyard," making about 12 knots for most of the 24-hour trip.

> *"Everybody was geared up—myself and the crew—in a 'find it, find it' mode."*
> Rude skipper Lt. Cdr. James S. Verlaque.

The much larger, 163-foot *Whiting* is equipped with the latest, most sophisticated side scan sonar available, which had only recently been installed on the ship during its last inport at the Atlantic Marine Center in Norfolk, Va.

The new survey fish on *Whiting*, a Klein T5500, is the next generation of *Rude*'s side scan sonar, what Glang and his fellow hydrographers

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Focus On...

the Advanced Weather Interactive Processing System—AWIPS

Warning coordination meteorologist James Purpura at an AWIPS work station.

The completion of the AWIPS network at 152 Weather Service forecast offices and other sites around the country is the crowning achievement of a century of improving weather services, helping transform meteorology from a folk art to a practical science.

1900

Kite flying is the standard method for measuring "upper air" conditions. Weather observations are relayed by telegraph.

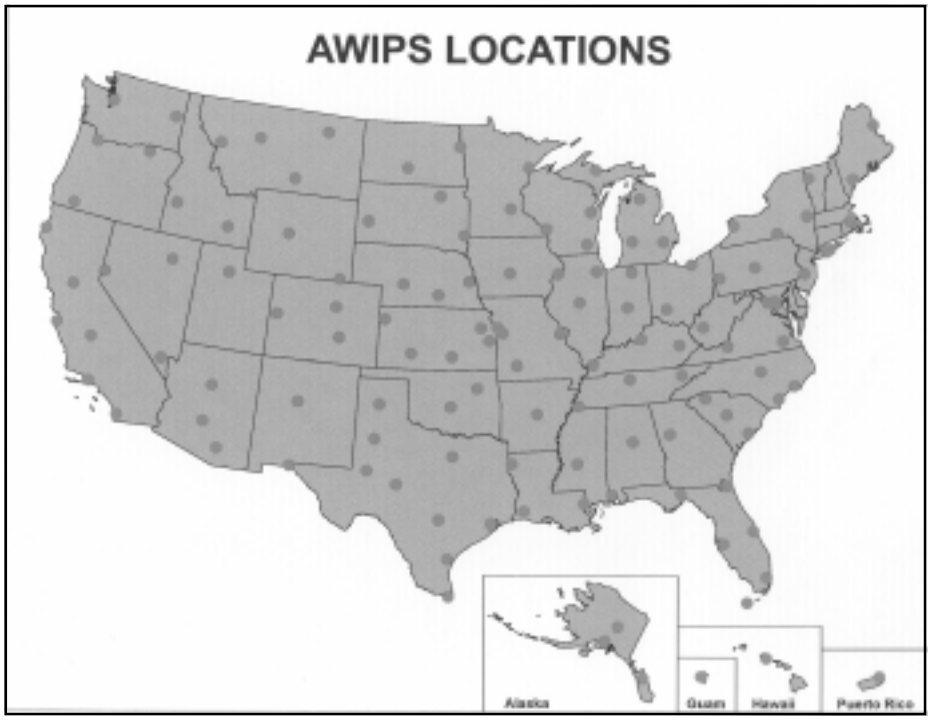
1920s

Airplanes and balloons provide a better view of weather, but information about weather conditions is sparse. Telephones improve communications.

1950s

Modified military radars provide fuzzy images of approaching weather. But tornado warnings are considered so unreliable they are banned, lest the public be unduly alarmed.

"Today we celebrate the beginning of modernized operations of NOAA's National Weather Service. The installation of the Advanced Weather Interactive Processing System is a milestone in the revolution of weather services for our country." Deputy Secretary of Commerce Robert Mallett, Baltimore-Washington Weather Service Forecast Office, Sterling, Va., July 28, 1999.



1980s

Obsolete military vacuum tube radars are still in use. Weather Service modernization begins. Satellites provide a global view of weather, with processing of weather information now aided by computers.

1999

The $4.5-billion modernization of the National Weather Service is complete. The three keystones of the modernization are in place: the Automated Surface Observing System, the Weather Surveillance Radar (WSR-88D) and the Advanced Weather Interactive Processing System.

21st century

Weather systems to be continually enhanced and upgraded, beginning with a new major capability to help forecasters make decisions during severe weather. A new software package will allow individual forecasters to modify "first guess" forecasts and automatically format the "official" forecasts.

Robert Chartuk/NOAA

NOAA Ship Whiting operations officer Lt. Lawrence Krepp adjusts the ship's sonar tow fish.

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call a "high-speed, high-resolution side scan sonar."

"The transducers are longer and they can actually form multiple beams, up to five beams," Glang said. "And they're narrower beams, so they're more focused, so I get the higher resolution. But I also get the higher firing rate, so I can pull the fish through the water faster," up to a maximum of about seven and a half knots, he said.

At about 1:30 in the afternoon, Glang called Verlaque aboard *Rude*. "Well, we're on the search. We're starting our box," he said, having already gotten the coordinates to investigate from the Unified Command Center at Otis Air Force Base.

Whiting began surveying in 80 to 100 feet of water, in near-zero visibility because of lingering fog.

At about 3:30 p.m., *Rude's* crew, still towing the side scan sonar fish, located what they called a "highly suspect, level 10 target." They tagged it "R-01" because it was the first target investigated. Level 10 is the highest confidence level.

"My XO was actually operating the sonar and I could tell he had seen something unusual," Verlaque said. "He became tense, more than normally. I also looked at the sonar screen and it was apparent that we saw something that was different than the normal terrain there," he said.

"There were literally thousands of rocks and boulders in the grid we surveyed," Verlaque said. But what they saw on the screen was definitely not a boulder.

The ship radioed Romeo Zero One's position to the *USS Grasp*, now on the scene with a remotely operated vehicle and divers.

Having given up surveying among the lobster pots, *Whiting* joined *Rude* in its search area.

"We came in right behind him and surveyed over the same area, where the contact that eventually proved to be the aircraft was located," Glang said.

With *Whiting's* newer generation tow fish, "we could see something that looked like it didn't belong there. It wasn't natural," he said.

Near midnight Tuesday, the Navy confirmed to Verlaque that Romeo Zero One was indeed the site of the Piper wreckage. In fact, the chain anchor of *Rude's* marker buoy had landed on the plane's fuselage.

For the rest of the night, *Rude* resumed surveying in the vicinity of the Piper wreckage.

The next day, Wednesday, their survey work now complete, *Rude* and *Whiting* helped the Coast Guard maintain a security zone.

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Robert Chartuk/NOAA

The NOAA Ship Whiting joins Rude in the search for JFK, Jr., off Martha's Vineyard.

BIG Awards Seven $1K Scholarships

This month, $1,000 college scholarship checks go out to seven outstanding 1999 graduates of Washington, D.C., area high schools, thanks to the NOAA chapter of Blacks in Government in Silver Spring, Md.

For the fourth year, BIG awarded scholarships to students who indicated a desire to major in a science or science-related discipline. The students also must excel in six areas—scholastic achievement, school activities, leadership, community outreach, special talents and moral character, according to Barbara Tobe, chairman of the scholarship committee.

At least one scholarship is reserved for children of NOAA employees, she said.

James Brown/DOC

Students receive BIG scholarships. (left to right) BIG scholarship committee chairman Barbara Tobe, BIG member Reginald Ready, students Salecia Hines and Jovan Durant, award reception speaker and public radio journalist Kojo Nnamdi, BIG president Bernard Cody, students Lucy Ngale and Kimberly Jenkins, BIG member Anthony Robinson and student Ricky Muse at the 1999 BIG scholarship award ceremony. Absent from photo, students Ronette Curtis and Felicity Watkins, daughter of NOAA employees Carmella and Ben Watkins.

Modernization Complete

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tion of new tools that will help the National Weather Service meet the demands of the next century," Mallett said.

"The modernization process we've been engaged in for the past decade is not just a Weather Service success story, but a NOAA success story," said NOAA Administrator D. James Baker. "Many NOAA scientists have contributed research and development expertise to the systems the Weather Service uses, and NOAA's satellite and data management branches are critical elements in the weather services provided to the nation."

"Our vision is to be America's no-surprise weather service and we are well on our way," said Weather Service director John J. Kelly, Jr.

AWIPS and Doppler radar helped forecasters in Norman, Okla., detect tornadoes and rapidly issue severe weather warnings that alerted people to the deadly tornado outbreak in May and helped save lives.

In July 1998, the advanced graphic display capabilities of AWIPS helped forecasters in Salt Lake City see heavy rains in Zion National Park. A timely flash-flood warning allowed at least 40 hikers to avoid a flooding canyon.

"Completing the National Weather Service modernization program has been a top priority for Commerce Secretary Daley and the Administration, who deserve credit for seeing this program to completion," Mallett said.

Statistics show overall improvements in forecast accuracy and in the timeliness of severe weather and flood warnings.

For an investment that costs each American about $4 per year, the Weather Service issues more than 734,000 weather forecasts and 850,000 river and flood forecasts, in addition to between 45,000 and 50,000 potentially lifesaving severe weather warnings annually.

"The modernization program is a great example of teamwork between industry and government," Kelly said. "The completion of AWIPS is a testament to years of hard work by hundreds of government and private sector individuals."

"We take great satisfaction in having reached this important milestone in the AWIPS program," said Leonard Pomata, Litton vice president and president of PRC, the primary AWIPS contractor. "But we are most proud to be an integral part of this important national program and look forward to continuing to work with the Weather Service to constantly improve the lifesaving capabilities of the AWIPS system," he said.

—Barry Reichenbaugh & Randee Exler

Herlihy Commands *Rainier*
Cdr. Daniel R. Herlihy is the new skipper of the NOAA Ship *Rainier*, NOAA's largest and most modern hydrographic survey vessel, operating primarily in Alaskan coastal waters.

News Briefs

Gerd Is New *Whiting* Skipper
Lt. Cdr. Gerd Glang is the new commanding officer of the NOAA Ship *Whiting*, a hydrographic survey ship that recently assisted in locating John F. Kennedy, Jr.'s, downed Piper Saratoga.

La Niña to Last
The current La Niña will last through the winter of 1999-2000, according to scientists at NOAA's National Centers for Environmental Prediction. The U.S. should continue to experience a mix of drier than normal conditions on the east coast, increased precipitation in the northwest and a more active Atlantic hurricane season.

Auster Is Ocean Champion
Peter J. Auster, a fisheries ecologist with the NOAA-funded National Undersea Research Center at the University of Connecticut and the Stellwagen Bank National Marine Sanctuary, has been named one of 11 1999 Pew Marine Conservation Fellows. He receives an award of $150,000 to conduct research that "addresses an urgent conservation challenge facing our seas."

Finding JFK, Jr.

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After a visit from Coast Guard Rear Admiral Richard Larrabee and NTSB Chairman James Hall, *Rude* and *Whiting* received their orders: "stand down from operations."

Rude, which was still operating non-stop, departed the scene near dusk, almost exactly 96 hours after it arrived.

"After we were released from the scene, we transited for Montauk and stopped at Block Island because the crew was fatigued," Verlaque said with typical understatement.

Glang prepared *Whiting* and its crew to travel to Rear Admiral Evelyn Fields' assumption of command ceremony in the Washington, D.C., Navy Yard.

Then, for the two ships it was back to mowing the lawn in Delaware Bay and Block Island Sound, and back out of the spotlight until the next time.

On July 30, the U.S. Coast Guard bestowed commendations on the officers and crews of Rude and Whiting and other uniformed and civilian members of the search and recovery team "for exceptionally meritorious service from 17 July 1999 to 23 July 1999 in the search and recovery of the downed aircraft carrying John F. Kennedy, Jr.; his wife, Carolyn Bessette Kennedy; and her sister Lauren Bessette. Members of the Unified Command distinguished themselves during this complex operation with their professional expertise and poise."

Hacking Is Common

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Although unaffected by the hackers, its site was shut down as well while technicians worked day and night to back up copies of the hacked system to preserve evidence for possible prosecution.

All three sites were back on-line two days later.

This kind of hacking of government sites is extremely common, as hackers illegally enter systems through old patches, easily guessable passwords, program buffer overflows and other vulnerabilities, according to Rebecca Vasvary, NOAA information technology security officer in the Telecommunications and ADP Security Branch in Silver Spring, Md.

Unfortunately, it has happened before to NOAA Web sites, and will happen again, Vasvary said.

NOAA has established a computer incident response team that notifies the NOAA community of viruses, security breaches and vulnerabilities in operating systems, she said.

Plus, the NOAA Network Operations Center has intrusion software in place and can provide NOAA offices with vulnerability scans of networks and other service to stymie hackers, Vasvary said.

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